

UCT-0048

**REMARKS**

Claims 1-18 are pending in the present application. Misnumbered claims 8-18 have been renumbered to 7-17. From hereon, all claim numbers refer to the renumbered and correct claim numbers. Claims 1, 2, 3, 5, 8, 11, 12, 13, 14, 15, and 17 have been amended, leaving Claims 1-17 for consideration upon entry of the present amendment. The Specification has been amended to correct certain typographical errors, as explained in detail below. No new matter has been introduced by these amendments. Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

**Specification Objections**

The following typographical errors have been corrected.

Page 1, line 3, applicant amends the year "2001" to "2002".

Page 12, line 6, applicant deletes the words "(Figure 1)".

Page 14, line 8, applicant amends the words "heated up to 7000" to "heated up to 70° C". This change is fully supported by the Provisional Application 60/395,183 as filed and therefore no new matter is added.

**Claim Objections****I.**

Claim 1, line 1, the Examiner has stated in the Office Action dated Aug. 2, 2005 that words "electrochemical reaction" should be amended to the words -- electrochemically reacting --. Applicants agree with the recommendation and amend the words "electrochemical reaction of" to "electrochemically reacting".

Claim 15, line 3, "R<sub>1</sub> and R<sub>2</sub>" should be amended to -- R<sup>1</sup> and R<sup>2</sup> --. Applicants agree with the recommendation and amend "R<sub>1</sub> and R<sub>2</sub>" to "R<sup>1</sup> and R<sup>2</sup>".

UCT-0048

## II.

Misnumbered claims 8-18 are renumbered 7-17 to reflect the correct numbering of the claims.

Claim Rejections - 35 U.S.C. § 112

Claims 1-2, 5, 11, and 14 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant has amended the claims according to the Examiner's suggestions. The applicant respectfully requests reconsideration and removal of the § 112 rejections.

Claim Rejections - 35 U.S.C. § 103

Claims 1-9 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Neef et al. ("Synthesis and Electronic Properties of Poly(2-Phenylthieno[3,4-b] Thiophene: A New Low Band Gap Polymer", Chem. Mater., Vol. 11 (1999), pp. 1957-1958; hereinafter "Neef"). Applicants respectfully traverse this rejection.

Neef generally discloses a process comprising electrochemical reaction of a monomeric composition comprising 2-phenylthieno[3,4-b]thiophene to form a polymeric composition comprising units derived from 2-phenylthieno[3,4-b]thiophene.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Applicants respectfully argue that Neef fails to teach or suggest each and every element of independent claim 1 of the present invention. Claim 1 relates to a process of electrochemically

UCT-0048

reacting a monomeric composition comprising thiophene[3,4-b]thiophene as opposed to a composition comprising 2-phenylthiophene[3,4-b]thiophene in Neef. Thiophene[3,4-b]thiophene and 2-phenylthiophene[3,4-b]thiophene have very different physical and chemical properties. They react differently in electrochemical cells to form different kind of polymers.

As a matter of fact, Neef emphasizes the fact that the extended conjugation of the substituting phenyl group lowers the oxidation potential of the substituted monomers compared to that of thiophene and facilitates electrochemical reaction, and the resulting polymers can be varied by introducing substituents onto the phenyl ring (first full paragraph, page 1957). Thus, there is no motivation to modify the teaching of the reference as Neef teaches away from using just thiophene[3,4-b]thiophene without the substituting phenyl group. Therefore, the invention as a whole would not have been obvious to one having ordinary skill in the art at the time the invention was made.

Since claims 3, 4, 8, and 9 all depend on independent claim 1 and claim 1 is not obvious over Neef, these claims would not have been obvious at the time the invention was made. The applicant respectfully requests reconsideration and removal of the § 103 rejections over claims 1-9.

Claims 10-12 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Neef as applied to claims 1-9, and further in view of Lazzaroni et al. (US Patent No. 4,663,001; hereinafter "Lazzaroni"). Applicants respectfully traverse this rejection.

Lazzaroni generally discloses that electroconductive polymers can be derived from heterocyclic polycyclic monomers formed of at least two cycles of five condensed members, each cycle containing one heteroatom, and a method of electrochemical polymerization by anodic oxidation of these monomers.

Applicants respectfully argue that Lazzaroni fails to teach or suggest the use of thiophene[3,4-b]thiophene to form electroconductive polymers. Lazzaroni recited that the family of bicyclic monomers which can be used include thiophene[2,3-b]thiophene. Thiophene[3,4-b]thiophene and thiophene[2,3-b]thiophene have very different conjugated bonds. As a result,

UCT-0048

they have very different chemical properties and electrochemical reactivities. Thus thieno[3,4-b]thiophene is not taught or suggested by Lazzaroni.

As presented previously, Neef equally fails to teach or suggest the use of thieno[3,4-b]thiophene to form electroconductive polymers. Since claims 10-12 claim a process of reacting thieno[3,4-b]thiophene with a co-monomer to form electroconductive polymers, all of the elements of claims 10-12 are not taught or suggested by Lazzaroni alone or in combination with Neef as thieno[3,4-b]thiophene is not taught or suggested. Therefore, claims 10-12 would not have been obvious over Neef in view of Lazzaroni. The applicant respectfully requests reconsideration and removal of the rejection over claims 10-12.

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Neef as applied to claims 1-9, and further in view of Lazzaroni as applied to claims 10-12, and further in view of Jonas et al. (US Patent No. 4,959,430; hereinafter "Jonas '430"). Applicants respectfully traverse this rejection.

Jonas generally discloses polythiophenes obtained from the polymerization of monomers having the following structure:



wherein X denotes an optionally substituted C<sub>1</sub>-C<sub>4</sub>-alkylene radical.

Applicants respectfully argue that Jonas '430 alone or in combination with Neef and/or Lazzaroni does not teach or suggest reacting thieno[3,4-b]thiophene with co-monomer to form



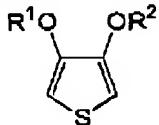
electroconductive polymers. The monomer structure disclosed in Jonas '430 is very different from thieno[3,4-b]thiophene. They have different conjugation, different chemical properties and electrochemical reactivities. Thus, there is no suggestion or motivation by Jonas '430 to use thieno[3,4-b]thiophene to form electroconductive polymers. As presented previously, Neef and/or Lazzaroni equally fails to suggest the use of thieno[3,4-

UCT-0048

b]thiophene to form electroconductive polymers. Since claims 13 and 14 claim a process of reacting thieno[3,4-b]thiophene with a co-monomer to form electroconductive polymers, all elements of claims 13 and 14 are not taught or suggested by Jonas '430 alone or in combination with Neef and/or Lazzaroni as thieno[3,4-b]thiophene is not taught or suggested. Therefore, claims 13 and 14 would not have been obvious over Neef in view of Lazzaroni and/or Jonas '430. The applicant respectfully requests reconsideration and removal of the rejection over claims 13-14.

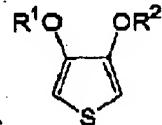
Claim 15 is rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Neef as applied to claims 1-9, and further in view of Lazzaroni as applied to claims 10-12, and further in view of Jonas et al. (US Patent No. 4,910,645; hereinafter "Jonas '645"). Applicants respectfully traverse this rejection.

Jonas '645 generally discloses polythiophenes obtained from the polymerization of monomers having the following structure:



in which R<sup>1</sup> and R<sup>2</sup> stand for hydrogen or a C<sub>1</sub>-C<sub>4</sub>-alkyl, phenyl, or substituted phenyl groups.

Applicants respectfully argue that Jonas '645 alone or in combination with Neef and/or Lazzaroni does not teach or suggest reacting thieno[3,4-b]thiophene with a co-monomer to



form electroconductive polymers. The monomer structure disclosed in Jonas '645 is very different from thieno[3,4-b]thiophene. They have very different conjugated bonds and different chemical properties and electrochemical reactivities. Thus, there is no suggestion or motivation by Jonas '645 to use thieno[3,4-b]thiophene to form electroconductive polymers.

As presented previously, Neef and/or Lazzaroni equally fails to suggest the use of thieno[3,4-b]thiophene to form electroconductive polymers. Since claim 15 claims a process of reacting thieno[3,4-b]thiophene with a co-monomer to form electroconductive polymers,

UCT-0048

not all elements of claim 15 are taught or suggested by Jonas '645 alone or in combination with Neef and/or Lazzaroni as thieno[3,4-b]thiophene is not taught or suggested. Therefore, claim 15 would not have been obvious over Neef in view of Lazzaroni and/or Jonas '645. The applicant respectfully request reconsideration and removal of the rejection over claim 15.

Claims 16 and 17 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Neef as applied to claims 1-9, and further in view of Jonas et al. (US Patent No. 5,300,575; hereinafter "Jonas '575"). Applicants respectfully traverse this rejection.

Jonas '575 generally discloses polythiophenes in the presence of polyanions.

Applicants respectfully argue that, Jonas '575 alone or in combination with Neef does not suggest the use of thieno[3,4-b]thiophene to form electroconductive polymers. The polythiophene structure disclosed in Jonas '575 is very different from thieno[3,4-b]thiophene. They have different conjugated bonds and different chemical properties and electrochemical reactivities. Thus, there is no suggestion or motivation by Jonas '575 to use thieno[3,4-b]thiophene to form electroconductive polymers.

As presented previously, Neef equally fails to suggest the use of thieno[3,4-b]thiophene to form electroconductive polymers. Since claims 16-17 claimed a process of reacting thieno[3,4-b]thiophene monomers further comprising polyanions to form electroconductive polymers, all elements of claims 16-17 are not taught or suggested by Jonas '575 alone or in combination with Neef as thieno[3,4-b]thiophene is not taught or suggested. Therefore, claims 16-17 would not have been obvious over Neef in view of Jonas '575. The applicant respectfully requests reconsideration and removal of the rejection over claims 16-17.

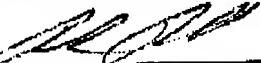
UCT-0048

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By 

Roberta Pelletier  
Registration No. 46,372  
Yong Zhao  
Registration No. 57,014

Date: October 20, 2005

CANTOR COLBURN LLP  
55 Griffin Road South  
Bloomfield, CT 06002  
Telephone (860) 286-2929  
Facsimile (860) 286-0115  
Customer No.: 23413